What is claimed is:

1. An integrated multi-channel transmitter for fiber optic applications, the transmitter comprising:

a stacked array of lasers, the stacked array of lasers being coupled to a first lenslet array, the first lenslet array comprising a plurality of lenses with each lens coupled to an output of one of said lasers and vice versa, the first lenslet array being disposed between the stacked array of lasers and an optical isolator, the isolator being disposed between the first lenslet array and a second lenslet array, the second lenslet array comprising a plurality of lenses with each lens coupled to an output of one of said lasers and vice versa, the second lenslet array being disposed between the isolator and a chip comprising a plurality of modulators, each modulator coupled to the output of one of said lasers and vice versa, the chip further comprising a coupler that receives the plurality of outputs from the modulators and combines them into a combined output signal.

2. The transmitter of claim 1 wherein the stacked array of lasers includes four lasers, the first and second lenslet arrays each include four lenses and the chip includes four modulators.

3. The transmitter of claim 1 wherein the modulators are Mach-Zehnder interferometers.

4. The transmitter of claim 1 wherein the coupler is a multi-mode interference coupler.

5. The transmitter of claim 1 wherein each of said modulators apply modulation to its respective laser output.

6. The transmitter of claim 1 wherein the chip further comprises a tap photodiode that measures the combined output signal.

7. The transmitter of claim 1 wherein the chip further comprises a plurality of tap photodiodes that measure outputs of each of said modulators.

8. The transmitter of claim 1 wherein each of said lasers is a distributed feedback laser.

9. The transmitter of claim 1 wherein each of said lasers is a tunable laser.

10. The transmitter of claim 1 wherein the chip is a lithium niobate chip.

11. The transmitter of claim 1 wherein the chip is made from a material consisting of $LiNbO_3$, InP and GaAs.

12. The transmitter of claim 1 wherein the chip is a polymer chip.

13. A planar lightwave circuit comprising:

an integrated multi-channel transmitter for fiber optic applications, the transmitter comprising

a stacked array of at least four lasers,

the stacked array of lasers being coupled to a first lenslet array comprising an array of lenses with each lens aligned with an output of one of said lasers and vice versa, the first lenslet array being disposed between the stacked array of lasers and an optical isolator,

the isolator being disposed between the first lenslet array and a second lenslet array, the second lenslet array comprising an array of lenses with each lens aligned with an output of one of said lasers and vice versa after said outputs have passed through the first lenslet array and isolator, the second lenslet array being disposed between the isolator and a modulator chip,

the chip comprising an array of modulators with each modulator coupled to the output of one of said lasers and vice versa after the output of each laser has passed through the lenslet arrays and the isolator, the chip further comprising a coupler that receives the at least four outputs from the modulators and multiplexes them into a combined output signal,

the chip being coupled to an optical fiber that receives the combined output signal.

14. The planar lightwave circuit of claim 13 wherein the modulators are Mach-Zehnder interferometers.

15. The planar lightwave circuit of claim 13 wherein the coupler is a multi-mode interference coupler.

16. The transmitter of claim 13 wherein the chip is a lithium niobate chip.

17. The transmitter of claim 13 wherein the chip is made from a material consisting of $LiNbO_3$, InP and GaAs.

18. The planar lightwave circuit of claim 13 wherein the chip further comprises a tap photodiode that measures the combined output signal.

19. The planar lightwave circuit of claim 13 wherein the chip further comprises at least four tap photodiodes that measure outputs of each of said modulators.

20. The planar lightwave circuit of claim 13 wherein each of said lasers is a distributed feedback laser.

21. The planar lightwave circuit of claim 13 wherein each of said lasers is a tunable distributed Bragg reflector laser.

22. A method for integrating a multi-channel optical transmitter, the method comprising:

coupling a stacked array of at least four lasers a first lenslet array comprising an array of lenses so that each lens is aligned with an output of one of said lasers and vice versa, coupling the first lenslet array to an isolator so that the first lenslet array is disposed between the stacked array of lasers and an optical isolator,

coupling the isolator to a second lenslet array comprising a plurality of lenses so that the isolator is disposed between the first and second lenslet arrays and so that the each lens of the second lenslet array is aligned with an output of one of said lasers and vice versa after said outputs have passed through the first lenslet array and isolator,

coupling the second lenslet array to a chip comprising at least four modulators so that the second lenslet array is disposed between the isolator and the chip and so that each modulator is aligned with one of the outputs of one of said lasers and vice versa after the output of each laser has passed through the lenslet arrays and the isolator, the chip further comprising a coupler that receives the at least four outputs from the modulators and multiplexes them into a combined output signal.

coupling the chip to an optical fiber so the optical fiber is aligned with the combined output signal.

23. The method of claim 22 wherein the modulators are Mach--Zehnder interferometers.

24. The method of claim 22 wherein the coupler is a multi-mode interference coupler.

25. The method of claim 22 wherein and each of said lasers is one of a distributed feedback lasers or a tunable distributed Bragg reflector laser.

26. The method of claim 22 wherein the chip further comprises a tap photodiode that measures the combined output signal.

27. The method of claim 22 wherein the chip further comprises at least four tap photodiodes that measure outputs of each of said interferometers.

28. The method of claim 22 further comprising:

coupling the chip to an optical fiber so the optical fiber is aligned with the combined output signal.

29. A semiconductor chip comprising:

a plurality of modulators, each modulator coupled to the output of one of an array of lasers and vice versa, the chip further comprising a coupler that receives the plurality of outputs from the modulators and combines them into a combined output signal.

30. The chip of claim 29 wherein the modulators are Mach-Zehnder interferometers.

31. The chip of claim 29 wherein the coupler is a multi-mode interference coupler.

32. The chip of claim 29 wherein each of said modulators apply modulation to its respective laser output.

33. The chip of claim 29 wherein the chip further comprises a tap photodiode that measures the combined output signal.

34. The chip of claim 29 wherein the chip further comprises a plurality of tap photodiodes that measure outputs of each of said modulators.

35. The chip of claim 29 wherein the chip is made from a material consisting of $LiNbO_3$, InP and GaAs.

36. The chip of claim 29 wherein the chip is a polymer chip.

37. A communications network comprising:

a wavelength division multiplexer comprising

an integrated multi-channel transmitter for fiber optic applications, the transmitter comprising

a stacked array of lasers, the stacked array of lasers being coupled to a first lenslet array,

the first lenslet array comprising a plurality of lenses with each lens coupled to an output of one of said lasers and vice versa, the first lenslet array being disposed between the stacked array of lasers and an optical isolator,

the isolator being disposed between the first lenslet array and a second lenslet array,

the second lenslet array comprising a plurality of lenses with each lens coupled to an output of one of said lasers and vice versa, the second lenslet array being disposed between the isolator and a chip comprising a plurality of modulators,

each modulator coupled to the output of one of said lasers and vice versa, the chip further comprising a coupler that receives the plurality of outputs from the modulators and combines them into a combined output signal.

38. The network of claim 37 wherein the stacked array of lasers includes four lasers, the first and second lenslet arrays each include four lenses and the chip includes four modulators.

39. The network of claim 37 wherein the modulators are Mach-Zehnder interferometers.

40. The network of claim 37 wherein the coupler is a multi-mode interference coupler.

41. The network of claim 37 wherein each of said modulators apply modulation to its respective laser output.

42. The network of claim 37 wherein the chip further comprises a tap photodiode that measures the combined output signal.

43. The network of claim 37 wherein the chip further comprises a plurality of tap photodiodes that measure outputs of each of said modulators.

44. The network of claim 37 wherein the chip is made from a material consisting of $LiNbO_3$, InP and GaAs.

45. The network of claim 37 wherein the chip is a polymer chip.